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Additional Risk Factors that can be used to Explain more Anomalies: Evidence from Emerging Market

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Abstract

This study aims to identify additional risk factors that can provide a better explanation to the variation in stocks' rate of return. Using monthly data for the period from July 2002 to June 2010 for a sample of listed companies traded in Amman Stock Exchange (ASE). This study introduces risk factor, such as Momentum, distress and leverage to investigate their effect on the explanatory power of the original model that was introduced by Fama & French three Factor Model, and which has been tested by (Almwalla and Karasneh[1]) using data from Amman Stock Exchange. The study observes the existence of the size, value, Momentum, distress and leverage effects in the Jordanian Market. Adding the Momentum, distress and leverage risk factors did not improve the explanatory power for the three factor model.

Keywords: Asset Pricing Model, Markets anomalies, Momentum effect, distress effect, and leverage effect.

1. Introduction

Sharp(1964) introduces the CAPM, as a new way of selecting securities and assets using the underlying assumption of Markowitz model and the single index model. A according to Sharp, rational investors are those who set a balance between risk and return and always prefer to be in the safe side, but if faced by risk, they try to diversify in order to mitigate risk. The main assumption of the CAPM is that, if all investors use Markowitz framework, they will seek portfolios located in the efficient frontier.

Ross (1976) developed the arbitrage pricing theory (APT). This theory is considered as a new method that can relate risk and return. The APT is based on the Law of one price, which simply suggests that if two assets have the same features, they should be traded at the same market price even if sold in different markets. This implies that no investors can earn abnormal return if Arbitrage conditions are met. The weakness and limitations of the CAPM and the APT have encouraged (Fama & French, 1996) to introduce an alternative way to predict stocks' returns. They examines not only the effect of the market portfolio rate of return on the stocks rate of return but also the effect of other risk factors such as firm size, E/P ratio, leverage and book to market equity ratio. Inspired by the results of their previous study, Fama & French (1993) developed what became known the Fama & French three factor model. Carhart (1997) added a fourth factor to Fama and French three factor, the author called this factor the "momentum factor", the aim was to capture the effect of short term reversals that appear on both papers of (Fama & French1993,1996) Hence, adding extra factors to the original model that relate risk to returns might help to improve the predictive power of multifactor model.

This paper is organized as follows: Section two introduces the related literature. Section three discusses the data and methodology. Empirical results are presented in Section four. The last section provides the summary and conclusions.

2. Literature Review

Jegadeesh and Titman (1993) indicate that the trading strategies that buys a past winners stocks and sell a past losers stocks realized significant abnormal rate of return, they related that to the quarterly earning report reaction, that reveal the financial situation of the firm and if the financial situation is revealed to be good, the effect might last to the next quarter. The sample was drawn from NYSE and AMEX markets over the period from 1965 to 1989. Fama and French (1993) argued that momentum effects are not captured by three factor model. Chan *et al*.(1996) Define Momentum as "the phenomenon that prices of rising assets tend to rise in the future or that past winner will yield a higher return than past losers". Asness (1997) investigates the interaction between momentum and value strategies, the author used monthly data from CRSP and COMPUSTAT data bases over the period from 1993 to 1994. The results indicate that both strategies are effective and the value strategy work better with low-momentum (loser) stocks and less effective with high momentum (winner) stocks. This indicates that both strategies are negatively correlated.

Rouwenhorst (1998) used data from 12 European countries over the period from 1978 to 1995, his sample covers, on average, between 60 to 90 percent of each countries market capitalization with a total of 2000 firms. The study provides a test of momentum effect, and the effect of the firm size on the stock return, he used similar methodology of (Jegadeesh and Titman, 1993), and he postulates that in all countries the winners stocks outperform the losers stocks by one percent monthly, he also observed a negative relation between market capitalization and stocks return, and that Momentum phenomenon does exist and does not appear by chance. (Chan *et al*.,2000) Examine the profitability of Momentum strategy in 23 countries around the world over the period from 1980 to 1995 using price indices in these countries. The results indicate that Momentum profits are statistically and economically significant in all countries indices, and lend support to the exiting of very short term momentum effect (from one to four weeks). The study concludes that the effect of Momentum profitability increases following the increase in trading volume.

Griffin *et al*.(2002) examine if the multifactor macroeconomic model of returns explains the momentum profits in 40 countries. The results indicate that the momentum is economically large and statistically reliable in all countries, they also revealed that economic multifactor have the capability to explain momentum effect. Marx (2009)examines the existence of momentum effect using a sample drawn from CRSP data base over the period from 1926 to 2008. He indicates that the intermediate horizon (seven to twelve months) past performance are primary drivers momentum not the long term

past performances. According to Marx, the effect of momentum appears not only in the cross-section of US equities but also in the international equity indices and currencies market.

Gharghori *et al.*(2007) use monthly data over the period of (1996 -2004), they investigate the ability of the Fama & French three factor model to explain the cross-section variation in equity return in the Australian equities market. They pointed out that previous empirical test in Australia market focused on the traditional (Fama and French[12]) methodology, while they did not provide any possible explanation to how stocks are priced with respect to the default risk that firms face. Moreover, they argue that the Fama & French factors cannot explain whether or not equity prices reflect the default risk. They indicate that the evidence provided by (Fama and French,1996) on the capability of the three factor model to explain the default risk and its relationship with equity pricing are not observed in the Australian equities market.

3. Data and Methodology

3.1. Data

The study aims at investigating the ability of leverage and distress as risk factors to explain the variation in stocks rate of return. To achieve this objective the study extend the Fame & French three factor model by adding factors (leverage, distress) measures that may have an additional explanatory power. Using monthly data for the period from July 2002 to Jun 2010 for a sample of companies listed in Amman stock exchange and that satisfy the following criteria:

I. Each stock should have trading record at Jun of year t-1 and on Jun of year y, and should have positive book value on December of year t-1, (FF, 1993, 1996).
II. To exclude the extremely thin traded stocks, the stock should have at least three consecutive months trading record.

The study sample included 121 firms in 2002, and became 205 in 2010.

The monthly rate of return for each stock is calculated to run the time-series test, the monthly rate of return for each stock in the sample is calculated as follows

$$R_{jt} = (P_{jt} - P_{jt-1})/ P_{jt}\text{-}1) + D_{jt} \quad (1)$$

Where:

R_{jt}: is the rate of return of stock J at month t.

P_{jt}: is the average daily closing price of the stock J at month t.

PJ_{t-1}: is the average daily closing price of the stock J at month $_{t-1}$.

D_{jt}: is the dividend yield of stock J at month t.

All of the information about the book value for the firms and dividend has been obtained from the monthly statistical bulletin published by ASE. In order to calculate the rate of return for the market, this study used the value- weighted index for ASE as proxy for the market portfolio rate of return. This study uses the three months treasury bills rate of return as a proxy for the risk free rate.

3.2. Methodology

In order to construct the augmented factors model, a two stages procedure was developed; the first stage involves the construction of the independent variables, and the second stage involves the construction of the dependant variables (portfolios). The current study uses similar constructing mimicking used by (Fama and French) to construct the SMB, HML, Momentum, leverage and distress factors.

3.2.1. The Model

For the purpose of this study, the following time-series regression is used

$$R_{pt}\text{-}R_{ft} = a + \beta_1 [R_{mt} - R_{ft}] + \beta_s SMB_t + \beta_h HML_t + \beta_w WML_t + \beta_L LEV_t + \beta_D DIS_t + \varepsilon \quad (2)$$

Where:

Rp $_t$ *= the realized return on portfolio at month t.*

Rf $_t$ *=is the risk free rate at month t.*

a*= the intercept.*

Rm $_t$ *= the realized return on the market at month t.*

SMB*=the difference in returns on small firms and large firms during time period t.* ***HML***$_t$ *= the difference in returns of firms with high book-to-market value (B/M) ratios and the returns of firms with low B/M ratios.*

WML $_t$ *= difference between the return on a portfolio of winner-stocks and the return on a portfolio of loser-stocks.*

LEV $_t$ *= the difference in returns of firms with high leverage and the return of firms with Low leverage.*

DIS $_t$ *= the difference between the return on a portfolio of distress -stocks and the return on a portfolio of non distress -stocks.*

β1, βs, βh, βw, βL and βD: sensitivity associated with each corresponding factor.

ε: is the error in estimation.

3.2.2. Portfolios Construction Procedures

In order to construct the SMB, HML, LEV, DIS and WML factors, this study used similar constructing mimicking that have been used by (Fama and French,1996). In June of each year (t) all stocks in the sample are ranked based on the firm size (average daily closing price times the number shares outstanding) stocks are assigned into two portfolios of size (Small (S) and Big (B)) based on split point which is 50%, that means the highest 50% stocks are the big and the lowest 50% stocks are the small.

SMB (small minus big) is the difference each month between the simple average rate of return on the three small stocks portfolios (SL, SM, and SH) and the simple average rate of return on the three big stocks portfolios (BL, BM, and BH).(FF^{12}).

SMB= ((SL- BL) + (SM -BM) + (SH- BH))/3 (3)

The same stocks are independently resorted into three portfolios based on the book to market equity ratio at December of year t-1, Based on the break point for the bottom 30 % (Low), middle 40% (Medium), and top 30% (High), based on the intersection between two market capitalization groups (S&B) and three Books to market equity groups (L, M and H).

HML (high minus low) is the difference each month between the simple average rate of return on two high book to market equity stocks portfolios (SH and BH) and the simple average rate of return on the two low book to market equity stocks portfolios (SL and BL).

HML= ((SH- SL) + (BH- BL))/2 (4)

Six value weighted portfolios are constructed (SL, SM, SH, BL, BM, BH) stocks with small market value and low book-to-market ratio assigned into (SL) portfolio and so on. The value weighted monthly rate of return on the six portfolios is calculated each month over the twelve months following portfolios constructed.

To construct the WML (momentum factor) for each month from July of year t-1 to June of year t, stocks are ranked based on size and prior performance. The size is based on the firm size (average daily closing price times the shares outstanding) at the end of June in year t-1 and the prior performance is based on the previous 11-month nominal stock return lagged 1 month. Stocks are assigned into two portfolios of size (Small (S) and Big (B)) based on the split point of 50%, that means the highest 50% stocks are the big and the lowest 50% stocks are the small. The same stocks are independently resorted into two portfolios based on previous 11-month nominal stock return lagged 1 month (Jegadeesh and Titman,2001). Winners (W) are the top 30% of the total stocks with the highest average prior performance. Losers (L) are the bottom 30% of the total stocks with the lowest average prior performance.

WML (winner minus loser) is the difference each month between the simple average rate of return on two winner stocks portfolios (SW and BW) and the simple average rate of return on the two loser stocks portfolios (SLs and BLs)

WML= ((SW- SLs) + (BW- BLs))/2 (5)

Four value weighted portfolios (SLs, SW, BLs, and BW) are formed based on the intersection of size and prior performance. The value weighted monthly rate of return on the four portfolios is calculated each month over the twelve month following portfolios construction.

To construct the LEV (leverage factor) in June of each year (t), all stocks on the study sample are ranked based on the firm size (average daily closing price times the shares outstanding) stocks are assigned into two portfolios of size (Small (S) and Big (B)) based on split point which is 50%, that means the highest 50% stocks are the big and the lowest 50% stocks are the small. The same stocks are independently resorted into three portfolios based on the total liability to total assets ratio (Debt Ratio) at December of year t_{-1}. Based on the break point for the bottom 30 % (Low), middle 40% (Medium), and top 30% (High), and depending on the intersection between two market capitalization (S&B) and three Debt Ratio groups (L, M and H), six value weighted portfolios are formed.

LEV= ((SHL- SLL) + (BHL- BLL))/2 (6)

LEV (leverage risk premium) is the monthly difference between the simple average rate of return on two high leverage stocks portfolios (SHL and BHL), and the simple average rate of return on the two low leverage stocks portfolios (SLL and BLL).

To construct the DIS factor (distress risk premium factor) in June of each year (t) all stocks on the study sample are ranked based on the firm size (average daily closing price times the shares outstanding), stocks are assigned into two portfolios of size (Small (S) and Big (B)) based on split point which is 50%, that means the highest 50% stocks are the big and the lowest 50% stocks are the small. The same stocks are independently resorted into three portfolios based on their **Altman** Z-score at December of year t-1. Based on the break point for the bottom 30 % is considered as a distress stocks (D), 40% (Medium), and top 30% is considered the non distress stocks (ND). Based on the intersection between two market capitalization groups(S&B) and three **Altman** Z-score groups (D, M and ND). Six value weighted portfolios are formed.

DIS = ((SD- SND) + (BD- BND))/2 (7)

DIS (distress risk premium factor) is the difference each month between the simple average rate of return on two distress stocks portfolios (SD and BD) and the simple average rate of return on the two non distress stocks portfolios (SND and BND).

In order to construct the dependent variable (rate of return for the stocks), Davis *et al.* (2000) procedure is used. In June of each year (t), all stocks in the study sample are sorted by the size (average daily closing price times the shares outstanding) and distributed into three size quintiles groups (S, M, B) by allocating equal number of stocks for each group, in other words, the smallest third goes to smallest group, the second third goes to medium group and the highest third goes to big group. The same stocks are independently resorted into three portfolios based on the book to market equity ratio as of December of year t_{-1}, and distributed into three books to market equity ratios quintiles groups (L, M, and H). Nine portfolios are formed (SL, SM, SH, ML, MM, MH, BL, BM, and BH) as the intersection of three size and three BE/ME groups, for example, the SL portfolio is comprised of stocks in the smallest third of firms and the lowest third of book to market equity ratio. The equally weighted monthly rate of return on the nine portfolios is calculated from July of year y to June of year t_{+1}.

4. Empirical Results

4.1. Summary Statistics

This section provides statistical description of portfolios that has been used to test the factor model. Table (1) shows the average monthly rate of return for these portfolios and the standard deviation for the dependent variables.

Table 1: Average Monthly Rate of Return, Standard Deviation and Sharpe Ratio for Dependent Variables (Nine portfolios).

book to Market equity Ratio	**Size**		
Mean monthly returns in excess of risk free rate			
	S	M	B
L	0.65	0.66	0.44
M	1.88	1.27	1.89
H	2.83	1.92	2.03
Standard deviation of monthly returns in excess of risk free rate (%)			
L	6.27	4.78	6.97
M	6.25	6.05	7.82
H	6.11	8.09	8.30
Sharpe ratio			
L	0.10	0.14	0.06
M	0.30	0.21	0.24
H	0.46	0.24	0.24

The Table shows the average monthly rate of return for the nine portfolios which represent the dependant variables of this study. It shows that the portfolios with small market capitalization outperform the big market capitalization portfolios. It also documents a strong and positive relationship between average rate of return and book-to market equity ratio, the three small portfolios (SL, SM, SH) generated on average higher rate of return than the three big portfolios (BL, BM, BH) by 0.33% on average, also the three portfolios with high book to market equity (SH, MH, BH) generated (on average) a rate of return that is 1.68% higher than the return generated by those low book to market equity (SL, ML, BL) portfolios. The results provide evidence supporting the size and value effect in Amman stock exchange, and are consistent with (Fama and French,1996) results in US market and (Drew *et. al*,2003) in Shanghai stock market. These results show positive relationship between average rate of return and (BV/MV) indicating that investors reflect the risk faced by value effect through demanding higher adjusted return.

Table (2) reported the result for the portfolios that formed the distress risk premium factor, leverage risk premium factor and momentum factor.

Table 2: Average Monthly Rate of Return, Standard Deviation and Sharpe Ratio for the portfolios that are constructed using the distress risk premium, leverage risk premium and momentum factors.

Mean monthly returns in excess of risk free rate		**Size**	
portfolios formed factor		**S**	**B**
WML	Winner	2.92	2.20
	Loser	2.83	0.97
LEV	High leverage	1.73	1.58
	Low leverage	1.61	-0.53
DIS	Distress	2.05	0.56
	Non Distress	1.95	0.39
Standard deviation of monthly returns in excess of risk free rate (%)			
WML	Winner	7.61	7.88
	Loser	7.45	6.49
LEV	High leverage	5.97	7.34
	Low leverage	5.36	7.14
DIS	Distress	6.54	7.24
	Non Distress	6.62	6.72
Sharpe ratio			
WML	Winner	0.38	0.28
	Loser	0.38	0.15
LEV	High leverage	0.29	0.22
	Low leverage	0.30	-0.07
DIS	Distress	0.31	0.08
	Non Distress	0.29	0.06

Table (2) reports that in general all portfolios are winners, except the (big-low leverage portfolio), the result shows that the two winner portfolios (SW and BW) generated on average higher rate of return than the two loser portfolios (SLs and BLs) by 1.31% on average, it also shows that the two High leverage portfolios (SHL and BHL) generated on average higher rate of return than two Low leverage portfolios (SLL and BLL) by 2.23% and the portfolios that contain the distress stocks (SD and BD) generated on average higher rate of return than the two non distress portfolios (SND and BND) by 0.27%, these result documents evidence of existing the momentum effect, distress and leverage risk premium in Amman stock exchange. These results also show positive relationship between average rate of return, distress and leverage risk premium indicating that investors reflect the risk faced by value effect through demanding higher adjusted rate of return. They are consistent with the assumption that investors demanded higher rate of return when facing higher risk. It also gives an indication that Jordanian investors are on average are rational investors. This is supported by the behavior of standard deviation for the rate of return; the results show that the standard deviation reflects the increase and decrease in the rate of return for the twelve portfolios. Also the result shows the strength of the size effect in Amman stocks market, since all small size portfolios have generated average rate of return that exceeds the rate of return that has been generated by big portfolios. Table (3) shows statistical description of the time-series regression for explanatory variables (Rm-Rf, SMB, HML, WML, LEV and DIS) for the period from July 2002 to June 2010.

Table 3: Summary statistics for the factors model monthly returns period (N =96).

Portfolios	Mean	Std. Dev.	Min	Max	t(Mean)
RM-RF	1.01	6.27	-16.39	15.91	1.56
SMB	0.36	4.55	-14.20	15.96	0.76
HML	1.82	5.41	-20.04	23.04	3.28
WML	0.62	4.70	-9.23	12.75	1.30
DIS	0.07	4.67	-9.41	18.91	0.14
LEV	0.63	4.55	-14.32	11.71	1.35

T is the mean rate of return divided by its standard error (Standard Deviation/96^.5), from July 2002 to June 2010.

It shows that the HML factor (value premium) has the highest average excess rate of return and has a reliable value premium in return (1.82 percent per month, t = 3.28).Thus, not surprisingly, there is a strong value premium in rate of return, and this result is consistent with (Davis *et al*,2000), the market risk premium came next to the value premium followed by LEV, WML, SMB and DIS. Table (4) reported the correlation matrix between the independent variables.

Table 4: Correlation Coefficients between the explanatory variables

Factors	RM-RF	SMB	HML	WML	DIS	LEV
RM-RF	1.00					
SMB	-0.60	1.00				
HML	0.16	-0.19	1.00			
WML	-0.01	-0.08	0.02	1.00		
DIS	0.11	0.08	-0.16	-0.21	1.00	
LEV	0.22	-0.12	-0.27	0.16	0.63	1.00

As a rule of thumb, the independent variables should not be correlated or at least the correlation between independent variables should be low. However, the correlation coefficient between size risk premium (SMB) and market risk premium (Rm-Rf) is (ρ=-0.60), which indicates that the (SMB) and (Rm-Rf) factors are both highly negatively correlated which implies that the variation in (Rm-Rf) factor have a strong effect in the SMB factor estimation, the lowest correlation observed between (HML) and (WML) factors. Table (5) shows the VIF test results and indicates the absence of Multicoliniarity between the explanatory variables.

Table 5: VIF-test for Multicoliniarity

Variable	VIF	1/VIF
LEV	2.26	0.44
DIS	2.09	0.48
SMB	1.68	0.59
RM-RF	1.68	0.59
WML	1.24	0.80
HML	1.18	0.85
Mean VIF	1.69	

4.2. Regression Results

The main objective of this study is to identify the risk factors that provide a better explanation to the variation in stock rate of return. The different asset pricing models have been developed during the past century. The most popular are the CAPM and the Fama & French three Factor Model. This study is to provide an augmented factor model that takes into consideration the effect of the past performance to stocks rate of return and the effect of the leverage and distress on the firm's performance. This sub section reports the statistical results for different model and provides a comparison between these models.

4.2.1. The CAPM Test

Table 6: The Estimation Result of the Capital Asset Pricing Model.

$Rp-Rf = a + \beta (Rm-Rf) + \acute{\varepsilon}$

Portfolios	a	β	t(a)	t(β)	AdjustedR^2
SL	0.30	0.34***	0.49	3.55	0.11
SM	1.32**	0.55***	2.44	6.50	0.30
SH	2.24***	0.58***	4.40	7.27	0.35
ML	0.18	0.47***	0.48	7.60	0.37
MM	0.73	0.54***	0.52	6.53	0.31
MH	1.02	0.90***	1.69	9.39	0.48
BL	-0.47	0.91***	-1.14	13.77	0.67
BM	0.93	0.96***	1.78**	11.66	0.59
BH	1.13	0.90***	1.78**	8.96	0.46

The intersection between small size and low book to market equity precede (SL) portfolios and so on.
** Significant different from zero at the 5% level. * Significant different from zero at the 10% level.*** Significant different from zero at the 1% level.

The above table reports the result of the (CAPM) test. The table shows that the market risk premium coefficients are significant for all portfolios (SL, SM, SH, ML, MM, MH, BL, BM, and BH) at $\alpha = 1\%$, but these market risk premium coefficients give incorrect direction to the excess rate of return for the portfolios that are reported in Table(1). The market beta coefficients indicate that the big portfolios are more risky than the small portfolios at the same level of the intersection with book to market equity and these big portfolios should generate average rate of return that exceeds the rate of return generated by small portfolios. However, these results contradict the results in table (1), even though, the medium portfolios coefficients give the same indication (SM and SH) portfolios. This evidence can reduce the ability of the single factor model (CAPM) in predicting the monthly excess rate of return in Amman stock market. This is because: (i) the value-weighted index which is used in this study as proxy for market return (RM) is biased to the big firms (stocks) or (ii) the CAPM assumptions like the assumption about short selling and other assumptions which are not applied in Amman stock market. This evidence is consistent with (Lam, 2002) in US markets and (Malin and Veeraraghavan, 2004) in European markets and (Al-Mwalla and Karasneh, 2011) in Jordan.

4.2.2. The Fama & French Three-Factor Test

Table 7: Fama and French Three-Factor test: the Excess Rates of Return on the Nine Portfolios are the Dependent Variables and Three Factors are the Independent Variables.

(Rpt-Rft =a+β1 [Rmt – R ft] + βs SMB t+ βh HMLt+ ε)

Portfolios	a	β	S	H	t(a)	t(β)	t(s)	t(h)	AdjustedR^2
SL	0.07	0.43***	0.22	0.04	0.11	3.66	1.38	0.32	0.11
SM	0.60	0.71***	0.47***	0.22**	1.12	7.45	3.56	2.30	0.40
SH	0.97*	0.71***	0.50***	0.53***	2.36	9.72	4.93	7.48	0.63
ML	0.03	0.63***	0.37***	-0.07	0.08	9.04	3.82	-1.09	0.46
MM	-0.02	0.65***	0.38**	0.27**	-0.03	7.04	2.95	3.01	0.40
MH	-0.03	0.88***	0.16	0.55***	-0.05	8.79	1.13	5.63	0.60
BL	0.37	0.81***	-0.36***	-0.34***	0.96	11.95	-3.90	-5.07	0.76
BM	0.73	0.81***	-0.28**	0.24**	1.38	8.65	-2.15	2.67	0.63
BH	0.25	0.82***	-0.02	0.53***	0.40	7.57	-0.11	5.04	0.56

** Significant different from zero at the 5% level. * Significant different from zero at the 10% level.*** Significant different from zero at the 1% level.

The results in table (7) are consistent with the results on the market risk premium coefficients reported in table (6). However the market risk premium coefficients do not explain the variation in rate of return, the coefficients suggest that the (BL) portfolio is more risky than (SL) portfolios and should generate rate of returns that exceed the rate of return for that generated by (SL) portfolio and the same thing for the (SH) and (BH) portfolios. The SMB factor (size risk premium) coefficients are significant in all portfolios at α = 5% except the (SL), MH and (BH) portfolios, the coefficients for SMB factor become higher when moving to higher book to market equity portfolios. For HML factor (Value risk premium), the HML coefficients are significant in all portfolios at α = 5% except the (SL) and (ML) portfolios. The results presented in table (7) are consistent with the result in table (1) for the size and value effect in Amman stock exchange. The increase in the coefficients for SMB and HML reflect the variation in the rate of return among portfolios. The results about size, effect and value effect and the variation in rate of return are consistent with the finding of (Banz,1981) and (Berk,1995) and (Haugen,1995) in the US market. However, regarding the ability of the (SMB) and (HML) factors to reflect the difference in rate of return between small and big portfolios, the results in table (7) suggests that both factors have the same ability to reflect the variation in rate of return between small and big portfolios. Table (7) shows that the three factor model leaves enough variation in rate of return unexplained especially for the (SL) portfolios. The results reported for the adjusted R^2 range from 11% to 77%. The lowest of 11% is for the portfolio with the smallest market capitalization and lowest book to market equity. The adjusted R^2 s has a trend to increase with the increase in market capitalization. Table (7) shows that the three factor model can provide better explanation to the big portfolios relative to small portfolios. Comparing the results of the three factor model with those of CAPM, the Fama & French three factor model provide better explanation to the variation in stocks rate of return.

4.2.3. The Augmented Six Factor Model Test

In this section, the three factor model is augmented using the leverage, distress and the past performance to stocks (WML). Table (8) reports the estimation results of the six factor model.

Table 8: The Augmented Fama French Six Factor test: the Excess Rates of Return on the Nine Portfolios are the Dependent Variables and six Factors are the Independent Variables.

Rpt-R ft =a+β1 [R mt – R ft] + βs SMB t+ βh HMLt+ βw WML t + βL LEV t +βD DIS t + ε

Portfolios	a	β	S	H	W	D	L	t(a)	t(β)	t(s)	t(h)	t(w)	t(D)	t(L)	Adjusted R^2
SL	0.04	0.47***	0.3	0.01	0.24	-0.13	-0.01	0.06	3.65	1.63	0.12	1.58	-0.69	-0.07	0.12
SM	0.69	0.67***	0.38**	0.2*	0.03	0.04	-0.05	1.19	6.16	2.54	1.91	0.27	0.24	-0.27	0.33
SH	1.01**	0.7***	0.47***	0.54***	-0.01	0.16	-0.06	2.32	8.53	4.06	6.99	-0.14	1.36	-0.48	0.64
ML	0.39	0.58***	0.19*	-0.15**	0.08	0.17	-0.27**	1.05	8.19	1.93	-2.25	1	1.65	-2.45	0.47
MM	0.47	0.54***	0.11	0.15**	0.28**	0.34**	-0.48***	1	6.1	0.87	1.83	2.63	2.57	-3.47	0.41
MH	0.07	0.89***	0.15	0.53***	0.32**	0.06	-0.1	0.11	8.03	0.95	5.04	2.42	0.4	-0.61	0.61
BL	0.35	0.76***	-0.41***	-0.31***	0.11	0.19	0	0.87	10.21	-3.93	-4.45	1.25	1.71	-0.01	0.76
BM	0.59	0.81***	-0.26*	0.22**	0.16	-0.27*	0.07	1.1	8.07	-1.82	2.29	1.33	-1.86	0.44	0.65
BH	0.88	0.7***	-0.34**	0.4***	0.09	0.32**	-0.51***	1.54	6.59	-2.3	3.95	0.7	2.07	-3.06	0.61

** Significant different from zero at the 5% level. * Significant different from zero at the 10% level.*** Significant different from zero at the 1% level.

Table (8) presents the estimation results of the augmented Fama French Six Factor model. To investigate whether this model has the ability to explain the variation in monthly rate of return better than the FF three factor models. ; the results are in consistent with the results reported in table (7) about the ability of two factors namely (SMB) and (HML) to provide better explanation to variation in the portfolios excess rate of return than market beta coefficients. The coefficients for (WML) factor are statistically significant at $\alpha = 5\%$ for (MM and MH) portfolios only. The (WML) factor does not provide clear relationship for the portfolios that are sorted according to the intersection between market capitalization and book-to-market ratio. The explanatory power for the Fama & French three factor model in explaining the variation in excess rates of return for portfolios does not improve much by adding the (WML) factor. But, for portfolios that the (WML) factor coefficients are significant, adjusted R^2 s show an increase; for example the adjusted R^2 of the six factor model equal to 61% for the (MH) portfolio, while the adjusted R^2 of the three factors was provided is 60%. The leverage risk factor also provide the same results the coefficients for leverage (L) are statistically significant at $\alpha = 5\%$ for (ML, MH and BH) portfolios only. The coefficients for leverage (L) can not capture the variation in the portfolios rate of return and the added the leverage factor does not add much to the explanatory. The adjusted R^2 increased only for the portfolio for which this factor found significant. The coefficients for (distress) factor is statistically significant at $\alpha = 5\%$ for (MM and BH) portfolios only and for (BM) at $\alpha = 10\%$ only, hence adding this factor does not improve the adjusted R^2 for the model.

5. Summary and Conclusions

The main objective of this study is to identify the risk factors that provide a better explanation to the variation in stocks rate of return. This study is to provide an augmented factor model that takes into consideration the effect of the past performance of stocks rate of return and the effect of the leverage and distress factors on the firm's performance. The study also investigates the existence of the size, value, momentum, distress and leverage effects in ASE.

The results of this study provide evidence on the existence of size and value effects in Amman stock exchange, the result also shows the existence of the Momentum, distress and leverage effects in Amman stocks market, therefore, following investment strategy that select portfolios based on the Momentum, distress and leverage can provide a positive rate of return.

This study founds that the Fama &French three factor model has the ability to provide better explanation to the variation in the stocks rate of return over CAPM, also the three factors model has superior power to predict the portfolios rates of return over the single factor model (CAPM), both factors (SMB and HML) added to the explanatory power to the single factor model, but the (HML) factor has more constant relationship with the portfolios rate of return. Finally, adding Momentum, distress and leverage as factors to the Fama &French three factor model does not improve the explanatory power for the three factor model.

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